

JAN 18 2011

Docket No. 0015.02

PATENT

## IN THE UNITED STATES PATENT &amp; TRADEMARK OFFICE

In re application of )  
 )  
RONALD D. HATFIELD ET AL. ) Group Art Unit 1616  
 ) Examiner A. N. Pryor  
A Process for Inhibition of )  
Proteolytic Activity During )  
the Ensiling of Forages )  
 )  
Serial No. 10/736,155 )  
 )  
Filed December 15, 2003 )

The Honorable

The Commissioner of Patents

Sir:

BRIEF ON APPEAL UNDER 37 CFR 1.192

This Appeal Brief is responsive to the final rejection of claims 1-5, 7, 8, 10, 11 and 14-17 in the above-identified U.S. patent application.

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FEE PAYMENT AND EXTENSION OF TIME

Appellants do not believe that any fees are due at this time. An Appeal Brief was previously filed on November 17, 2009, and the fees for filing that Appeal Brief were paid at that time. Prosecution was subsequently reopened by the Examiner. However, the Commissioner is authorized to charge any delinquencies in fees to deposit account no. 50-2132.

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REAL PARTY IN INTEREST

The real party in interest is The United States of America, as represented by the Secretary of Agriculture, the assignee of record.

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences known to appellant, appellants' legal representative, or the assignee, which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF CLAIMS

Claims 1-5, 7, 8, 10, 11 and 14-17 are now of record in this application. Claims 1-5, 7, 8, 10, 11 and 14-17 have been rejected. No claims have been allowed. Claims 1-5, 7, 8, 10, 11 and 14 were amended, new claims 13-17 were added, and claims 6, 9, 12 and 13 were cancelled, by previously submitted amendments. Claims 1-5, 7, 8, 10, 11 and 14-17 are appealed.

STATUS OF AMENDMENTS

No Amendments After Final Rejection have been submitted in response to the current Final rejection, dated August 18, 2010. However, appellants note that two Amendments After Final

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Rejection were submitted in response to a first Final rejection, which was dated January 16, 2008, but the finality of that first Final rejection was withdrawn in the Office action dated May 29, 2008. The first Amendment After Final Rejection was submitted on March 5, 2008, and was not entered. The second Amendment After Final Rejection was submitted on April 24, 2008, and was entered. The claims were subsequently amended by additional Amendments, submitted July 17, 2008, February 12, 2009, and June 29, 2010, none of which were after Final rejection.

#### SUMMARY OF CLAIMED SUBJECT MATTER

Independent claims 1, 7 and 14 are of record in this application.

The independent claims are drawn to a method for reducing the proteolysis of ensiled crops (also known as silage). Independent claim 1 is limited to a method comprising contacting a crop material to be ensilaged with an o-diphenol compound and a polyphenol oxidase (PPO) at the time of ensilaging (page 5, paragraph no. 0012, lines 1-5, and page 10, paragraph no. 0022, lines 1-7). The o-diphenol compound and a polyphenol oxidase are provided in an amount effective to reduce the degree of proteolysis of the crop material (page 6, paragraph no. 0013, lines 5-7, and page 13, paragraph no. 0027, lines 1-5). Crop

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materials which are treated are selected from the group consisting of alfalfa, corn, wheat, triticale, rye, barley, oat, pea, sorghum, sudan, millet, and lentil (page 6, paragraph no. 013, lines 1-3). Appellants note that the above-mentioned paragraph nos. 0022 and 0027 were amended by the Amendment submitted May 4, 2007, to correct a typographical error and substitute the recitation of "o-diphenol" for "o-diphenyl" therein.

Independent claim 7 is limited to an alternate embodiment wherein the crop material to be ensiled is a polyphenol oxidase transformed crop (page 7, paragraph no. 0017, lines 1-8, and pages 9-10, paragraph no. 0021, lines 1-10). Thus, the transformed plant produces polyphenol oxidase and need only be contacted with an o-diphenol compound. As in claim 1, the crop material to be ensilaged is contacted with an o-diphenol compound at the time of ensilaging (page 5, paragraph no. 0012, lines 1-5, and page 10, paragraph no. 0022, lines 1-7). The o-diphenol compound is provided in an amount effective to reduce the degree of proteolysis of the crop material (page 6, paragraph no. 0013, lines 5-7, and page 13, paragraph no. 0027, lines 1-5). Crop materials which are treated are selected from the group consisting of alfalfa, corn, wheat, triticale, rye, barley, oat,

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pea, sorghum, sudan, millet, and lentil (page 6, paragraph no. 013, lines 1-3).

Independent claim 14 is identical to independent claim 1 with the sole exception that claim 14 recites a method "consisting essentially of" while claim 1 recites "comprising".

#### GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The issues for consideration as set forth in the Office actions are as follows:

- (1) Whether claims 1-5, 7, 8, 10, 11 and 14-17 are unpatentable under 35 U.S.C. 103 as being obvious over Hatfield (Characterization of red clover polyphenol oxidase, Plant Biology 2002 Program, Session 67, page 164) in view of Krutz (GB 2019731, 11/7/79).

#### ARGUMENTS

##### Rejection Under 35 U.S.C. 103

Claims 1-5, 7, 8, 10, 11 and 14-17 have been rejected under 35 U.S.C. 103 as being unpatentable over Hatfield (Characterization of red clover polyphenol oxidase, Plant Biology 2002 Program, Session 67, page 164) in view of Krutz (GB 2019731, 11/7/79). The Examiner has taken the position that Hatfield teaches a method for preserving forages, and that it would have

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been obvious to treat any crop with a red clover extract in order to prevent protein degradation. Appellants respectfully disagree.

Hatfield is an abstract describing a study of the endogenous polyphenol oxidase (PPO) present in red clover and its correlation with reduced proteolysis in red clover. The abstract discloses that the endogenous PPO and o-diphenol present in red clover inhibit protein degradation in red clover extracts (penultimate sentence).

Krutz is drawn to an apparatus for macerating forage, such as hay. The apparatus includes a mower (flail intake 67) for cutting the plant, rotating rollers 17 and 18 for macerate the cut forage 22 as it is passed therebetween, and a conveyor 25 for discharging a mat of the macerated forage (Fig. 3).

The independent claims are drawn to a method for reducing the proteolysis of ensiled crops (also known as silage). The art has long recognized the problem of proteolysis in silage and has proposed a variety of solutions for its inhibition (pages 1-2, bridging paragraph no. 0002, and pages 2-3, bridging paragraph no. 0004). In accordance with appellants' invention, the crop material to be ensilaged is contacted with an o-diphenol compound in conjunction with a PPO at the time of ensilaging (page 5, paragraph no. 0012, lines 1-5, and page 10, paragraph no. 0022,

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lines 1-7). Appellants have discovered that this treatment of the forage with PPO and an o-diphenol compound at the time of ensilaging is effective for prevention of excessive proteolysis of proteins (page 5, paragraph no. 0012, lines 1-5, and page 10, paragraph no. 0022, lines 1-7). Cop materials that may be treated include alfalfa, corn, wheat, triticale, rye, barley, oat, pea, sorghum, sudan, millet, and lentil (page 6, paragraph no. 0013, lines 1-3). Independent claim 7 is drawn to an alternate embodiment wherein the crop to be ensiled has been transformed to produce its own PPO. Thus, this transformed crop material need only be contacted with the o-diphenol compound as described above to inhibit proteolysis. This is not disclosed or suggested by the prior art.

As noted above, Hatfield relates to a description of the endogenous system of PPO and o-diphenol naturally present in red clover, and how this endogenous PPO and o-diphenol act to inhibit protein degradation in red clover extracts. The abstract does not disclose or suggest treating crop materials with PPO and o-diphenol as in claims 1 and 14, or treating a PPO transformed crop with o-diphenol as in claim 7, much less crops other than red clover as set forth in claims 1, 7, and 14. Appellants respectfully submit that a practitioner of ordinary skill in the art could not reasonably predict that the PPO/o-diphenol system



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which is naturally present in red clover would be effective as a treatment to inhibit proteolysis in other plants which lack this system.

It is well established that obviousness requires that the prior art provide at least some predictability or a reasonable expectation of success of the claimed process. See *Proctor & Gamble Co. v. Teva Pharmaceuticals USA Inc.*, Fed Cir., No. 2008-1404 (CAFC 2009), *In re Gangadharam* (CAFC 1989) 13 USPQ2d 1568, *In re Whiton* (CCPA 1970) 164 USPQ 455, and *In re Rinehart* (CCPA 1976) 189 USPQ 143. Contrary to the Examiner's conclusion, a practitioner skilled in the art could not predict or expect with any reasonable degree of certainty that the addition of PPO and o-diphenol to plants other than red clover would confer the same inhibition of protein degradation. Higher plants such as those claimed are exceptionally complex organisms with a myriad of inter-related biological systems therein. Simply because the prior art discloses that endogenous PPO and o-diphenol constitute a natural system inhibiting proteolysis in a single plant species, red clover, the practitioner skilled in the art could not reasonably predict that they would be effective as a treatment for all plants.

Krutz does nothing to alleviate the deficiencies in the disclosure of Hatfield. Krutz only relates to an apparatus for


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macerating forage. It does not disclose any system for inhibiting protein degradation in plants, much less using PPO and an o-diphenol.

In view of the foregoing, applicants respectfully submit that claims 1-5, 7, 8, 10, 11 and 14-17 distinguish over the prior art of record. Allowance thereof is respectfully requested.

Respectfully submitted,

  
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CLAIMS APPENDIX

1. A method for the reduction of proteolysis in ensiled crops comprising contacting a crop material to be ensilaged with an o-diphenol compound and polyphenol oxidase at the time of ensilaging in an amount effective to reduce the degree of proteolysis of the crop material, wherein said crop material is selected from the group consisting of alfalfa, corn, wheat, triticale, rye, barley, oat, pea, sorghum, sudan, millet, and lentil.

2. The method of claim 1 wherein the amount of said o-diphenol and said polyphenol oxidase is sufficient to reduce the degree of proteolysis by at least 20%.

3. The method of claim 1 wherein the o-diphenol compound is applied to the crop material to be ensilaged at a rate ranging from about 5 to about 30 micromoles per gram fresh weight and the polyphenol oxidase is applied to the crop material to be ensilaged at a rate ranging from about 0.1 to about 1.0 unit per gram fresh weight.

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4. The method of claim 1 wherein the crop material to be ensilaged is macerated to a conditioning index ranging from 30 to 60.

5. The method of claim 1 wherein the *o*-diphenol compound is selected from the group consisting of caffeic acid, catechol, chlorogenic acid, phasic acid, rosmarinic acid, caffeoyl tartrate, and caffeoyl glucose.

7. A method for the reduction of proteolysis in ensiled crops comprising contacting a polyphenol oxidase transformed crop to be ensilaged with an *o*-diphenol compound at the time of ensilaging in an amount effective to reduce the degree of proteolysis in the crop, wherein said crop is selected from the group consisting of alfalfa, corn, wheat, triticale, rye, barley, oat, pea, sorghum, sudan, millet, and lentil.

8. The method of claim 7 wherein the quantity of said *o*-diphenol compound is sufficient to reduce the degree of proteolysis by at least 20%.

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10. The method of claim 7 wherein the crop to be ensilaged is macerated to a conditioning index ranging from about 30 to about 60.

11. The method of claim 7 wherein the *o*-diphenol compound is selected from the group consisting of caffeic acid, catechol, chlorogenic acid, phasic acid, rosmarinic acid, caffeoyl tartrate, and caffeoyl glucose.

14. A method for the reduction of proteolysis in ensiled crops consisting essentially of contacting a crop material to be ensilaged with an *o*-diphenol compound and polyphenol oxidase at the time of ensilaging in an amount effective to reduce the degree of proteolysis of the crop material, wherein said crop material is selected from the group consisting of alfalfa, corn, wheat, triticale, rye, barley, oat, pea, sorghum, sudan, millet, and lentil.

15. The method of claim 1 wherein said crop material is selected from the group consisting of alfalfa and oat.

16. The method of claim 7 wherein said crop is selected from the group consisting of alfalfa and oat.

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17. The method of claim 14 wherein said crop material is selected from the group consisting of alfalfa and oat.

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EVIDENCE APPENDIX

None

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RELATED PROCEEDINGS APPENDIX

None